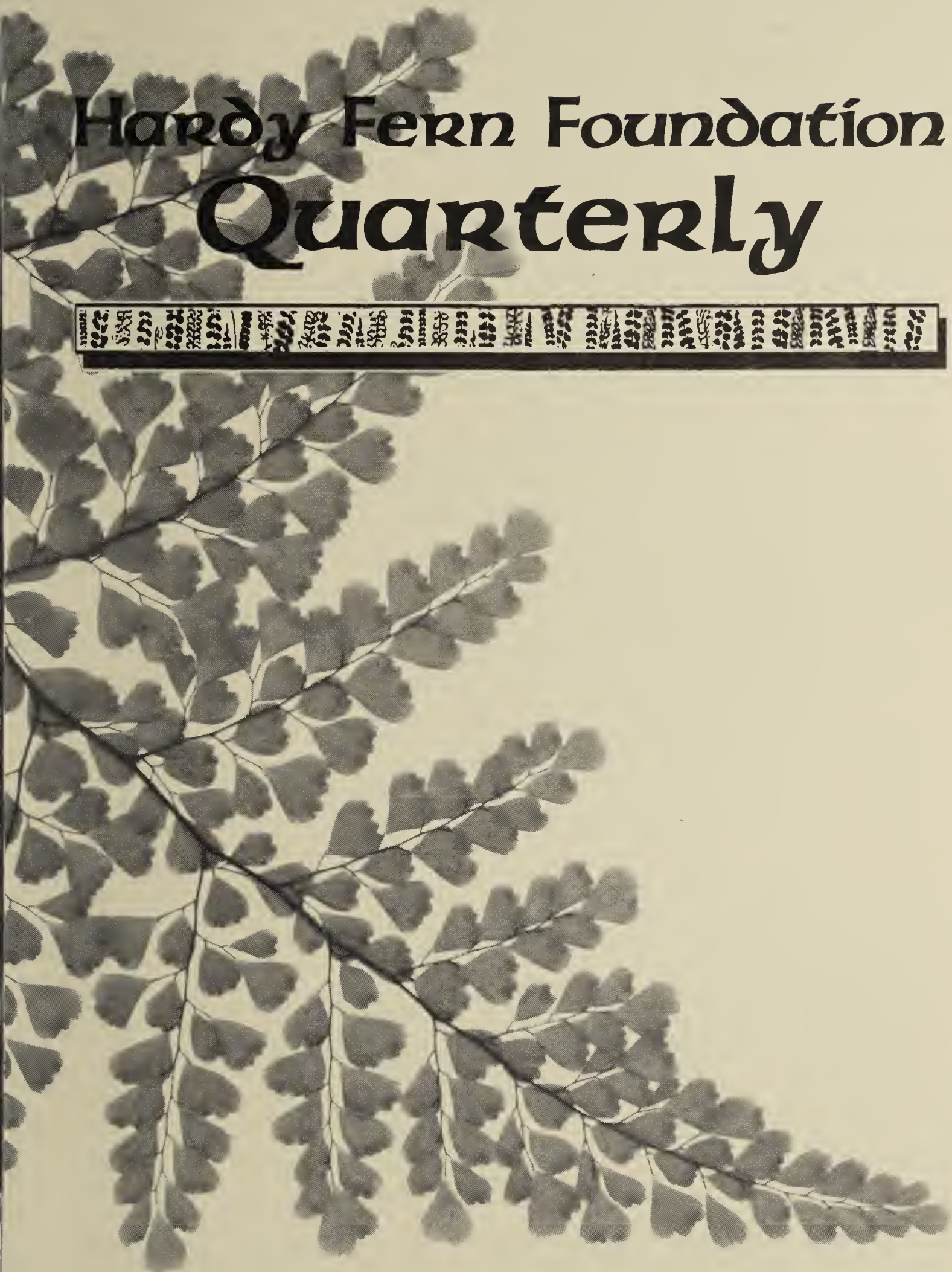
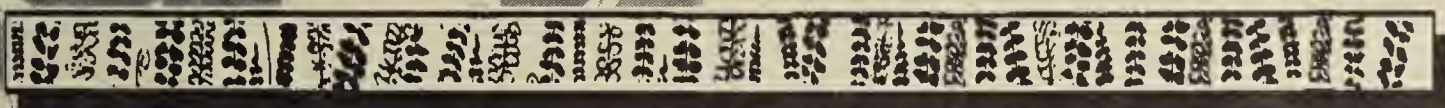


Hardy Fern Foundation Quarterly



THE HARDY FERN FOUNDATION

P.O. Box 166

Medina, WA 98039-0166

(206) 870-5363

Web site: www.hardyferns.org

The Hardy Fern Foundation was founded in 1989 to establish a comprehensive collection of the world's hardy ferns for display, testing, evaluation, public education and introduction to the gardening and horticultural community. Many rare and unusual species, hybrids and varieties are being propagated from spores and tested in selected environments for their different degrees of hardiness and ornamental garden value.

The primary fern display and test garden is located at, and in conjunction with, The Rhododendron Species Botanical Garden at the Weyerhaeuser Corporate Headquarters, in Federal Way, Washington.

Satellite fern gardens are at the Stephen Austin Arboretum, Nacogdoches, Texas, Birmingham Botanical Gardens, Birmingham, Alabama, California State University at Sacramento, Sacramento, California, Coastal Maine Botanical Garden, Boothbay, Maine, Dallas Arboretum, Dallas, Texas, Denver Botanic Gardens, Denver, Colorado, Georgeson Botanical Garden, University of Alaska, Fairbanks, Alaska, Harry P. Leu Garden, Orlando, Florida, Inniswood Metro Gardens, Columbus, Ohio, Lewis Ginter Botanical Garden, Richmond, Virginia, New York Botanical Garden, Bronx, New York, and Strybing Arboretum, San Francisco, California.

The fern display gardens are at Bainbridge Island Library, Bainbridge Island, WA, Lakewold, Tacoma, Washington, Les Jardins de Metis, Quebec, Canada, University of Northern Colorado, Greeley, Colorado, and Whitehall Historic Home and Garden, Louisville, KY.

Hardy Fern Foundation members participate in a spore exchange, receive a quarterly newsletter and have first access to ferns as they are ready for distribution.

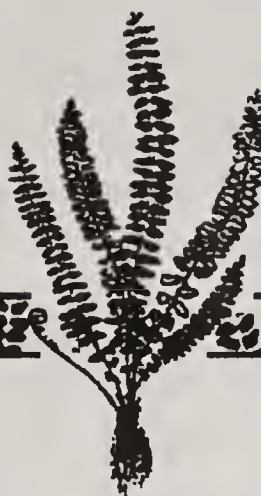
Cover Design by Willanna Bradner

HARDY FERN FOUNDATION QUARTERLY

THE HARDY FERN FOUNDATION

QUARTERLY

Volume 11 • No. 3 • Editor Sue Olsen

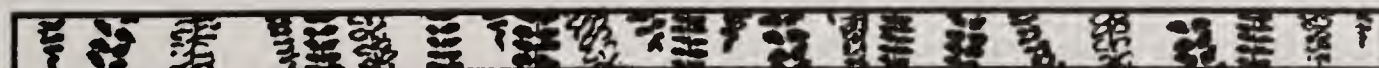


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The Spore Exchange Needs You

Please continue to send spores to:

Shannon Toal
4717 SW Graham Street
Seattle, WA 98136



President's Message

It is with great sorrow that I report the recent passing on May 30, 2001 of John Putnam, immediate past President of the Hardy Fern Foundation. John was an inspiration to us all, a generous person and a good friend. He will be sorely missed.

The annual Fern Festival sale on June 1 and 2, 2001 was especially successful, thanks to the organizational efforts of everyone involved. This was particularly fulfilling following a disastrous fire involving much of the Center for Urban Horticulture facility. Fortunately the space for our sale was untouched and we were allowed to proceed.

John van den Meerendonk delivered a most interesting travelogue concerning his recent trip with "A Garden Stroll Through China". The slides were awesome in scope and composition, generating interest and enthusiasm for the new Seattle Chinese Garden.

A seminar table clinic on propagation conducted by Michelle Bundy and Shannon Toal attracted a small but enthusiastic crowd and was well received by all. Since this was successful and so well organized, we will be able to use this workshop approach in the future.

On behalf of the entire Board of Directors, I would like to thank all of the members and non-members responsible for the extraordinarily successful festival. An abundance of healthy plant material both ferns and companions guaranteed a record sale.

We have a number of goals to work on during this new year. We are striving to increase inventory of ferns available for distribution and sale, expand on varieties and involve as many members as possible in our activities. Anyone interested in helping is encouraged to contact us via phone, mail or our web site.

Special thanks to Sylvia Duryee for her generous contribution of plants and coordinating expertise; Michelle Bundy, Becky Reimer and Shannon Toal for a lot of hard work and pleasant smiles; Sue and Harry Olsen and Foliage Gardens for recurrent and knowledgeable support. Last of all we are appreciative of the help from the Northwest Horticulture Society especially Karen Kravitz and Sue Clark for their voluntary help with sales management.

In closing we all wish a full and speedy recovery for our treasurer, Jack Docter following his surgery.

Best regards,


Pat Kennar - Bellevue, WA



Michelle Bundy leading the
Propagation Workshop.

Correction

**The Fall 2000 Quarterly
is Volume 10 No. 4 not
No. 3.**



THE HARDY FERN FOUNDATION
QUARTERLY

The Hardy Fern Foundation Quarterly is published quarterly by the Hardy Fern Foundation,
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Articles, photos, fern and gardening questions, letters to the editor, and other contributions are welcomed!

Please send your submissions to
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2003 128th Ave SE,
Bellevue, WA, 98005.

Newsletter:

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Graphics: *Willanna Bradner (cover design)*
Karie Hess (inside design)

Development and Cultivation of Chilean Native Fern Species for Commercial Use

Anja George - Osorno, Chile

Introduction –

In November 1998 we started a project called “Development and cultivation of Chilean native fern species for commercial use”. Our principal objective is: Investigation and adaptation of technologies for commercial production of plants and foliage from Chilean fern species.

The secondary objectives are: Get information on Chilean ferns and make this information available for gardeners and scientists: Propagate the selected species: Conservation of the species using them like ornamental plants or foliage.

The nursery where we are working on the project is located in the south of Chile in a town called Osorno, 950 km south of Santiago. The climate is a cool temperate rainy climate with an evergreen rainforest in serious danger of extinction. The project works with governmental support and the director of the project is a German horticulture engineer: Anja George (me). We began with a staff of 4 professionals but now we are only three persons because of financial restrictions.

After two and a half years we can propagate most of the investigated species by spores. But we haven't had results by propagation via rhizomes.

I'll try to describe some of the most important fern species, important because they can be used as ornamentals in gardens.

1. *Blechnum chilense*: This is a very robust and hardy fern, common in the south of Chile, growing along the roads, in humid places and sometimes treated by the people like a weed because of its fast growing rhizomes. The plants form big populations of about 1.5 meters tall and 20 meters wide. We found this species in all areas of the Lake District, in the Andean mountains up to 800 meters and at the Pacific coast. In some literature they mention this species as a tree fern, but we think this is wrong, because they only have a little trunk (20cms. perhaps) and you can't see it because of the big fronds. It grows associated with the following plants: *Nothofagus dombeyi*, *Lomatia hirsuta*, *Laurelia sempervirens*, *Luma apiculata*, *Lomatia ferruginea*, *Gevuina avellana*, *Fuchsia magellanica*, *Azara lanceolata*, *Escallonia arubra*, *Chusquea quila*, *Buddleja globosa* and many others.

Blechnum chilense grows very well in shady places, where the plants show large fronds, the sterile fronds horizontal and the fertile fronds vertical, with a dark green color. The most important and ornamental characteristic of this species are the new fronds in the springtime. We found places where the new fronds have colors from yellow to orange and deep red. We are not sure if it is because of a growing condition or if there is some special cultivar.

We propagate *Blechnum chilense* in this manner:

In late summer (February to March) the spores must be collected for being treated and

sown. We collect spores from our mother plants in the nursery, put them in a paper bag and let them dry for a few days (about 5 to 10 days). After this we clean the spores by passing them through a filter (the same they use for soil testing) and sow immediately in a substrate of compost and sand. The conditions during germination are very rustic because we don't have much technology. We put the pots in a greenhouse, without climate control. The soil must be humid all the time and there is always the beginning of a fungus infection. After a few weeks the fungus disappears and the prothallia starts growing. Depending on the temperature we must wait between 3 to 6 months. After 8 months normally we can put little groups of plants with new fronds in pots for faster growing. Normally we use sporelings in this step. The next period the plants grow very fast so that we can have commercial plants after two or three months. If you can maintain a temperature around 18° C all the time the spores will germinate faster and you will have plants in less time than 8 months.

I cultivate it as an indoor plant and there are no problems. It looks like a palm and is very decorative.

2. *Blechnum hastatum*: Another type of *Blechnum* is this small one with dark green fronds and no more than 50 cm. tall. We can find *B. hastatum* in nearly all places where native forests or singular native trees live. The plants grow above big trees where they appear with large populations of many plants. This species presents the same fertile fronds and sterile fronds. The only difference is the position. The fertile fronds are always in the middle growing vertically and the sterile fronds always grow more horizontally around the outside. But in this species the difference is not so obvious as in other *Blechnums*. You can find plants growing in full sun but they prefer shady and not too humid soil. A typical neighbor of *B. hastatum* is *Nothofagus dombeyi*, but there are a lot of native species that grow nearby.

At first we didn't consider this species for our studies, but then we always see it in the forest and so tried to reproduce it. In cultivation *B. hastatum* is a very beautiful plant, and useful for an indoor plant too.

The time to collect spores is very long here in South Chile. We found spores from December to April. The first plants we get were with "auto reproducing" in our greenhouse. (The spores of the mother plants fell down and one year later we found a lot of plants on the floor of the greenhouse.) This year we sowed spores in pots treated first with hot water preventing fungus in a substrate of compost and sand. We put the pots in the greenhouse (a rustic tunnel construction) where the temperature was between 10° (night) and 30° (day). The spores need a humid temperate and shady place where they present prothallia in two months or less if the climate conditions are good. This species is a fast growing type, very easy to propagate and a good plant for the garden or for indoors.

3. *Blechnum magellanicum*: This fern is a beautiful tree fern from the Chilean rain forest. We have seen plants with a trunk of 1.5 meters tall looking like a tropical palm. The difference between this tree fern and tropical tree ferns is that the trunk is

continued on page 54

Development and Cultivation of Chilean Native Fern Species for Commercial Use *continued from page 53*

the rhizome and the roots do not form it. You cannot cut the trunk for transplantation. *B. magellanicum* grows in places where other plants can't grow well. We found it near the Pacific coast in soil with only a few centimeters of organic matter and also on the volcano Osorno at more than 1,000 meters altitude growing in lava. This species is not very common and is difficult to find in the main valley. But more difficult to find are big plants near the roads. You can see the big plants only in parks and deep in the forest where people can't get in because they take the big ferns and sell them for garden plants. We are not sure, but we think that it takes a few hundred years to get them to 1.5 meters.

The color of the frond is a dark green with a brilliant surface. In humid conditions with too much water in the soil, the plants get black spots and the fronds turn to a clear green.

It seems to be difficult to propagate this species. I think our problem is that we don't have the technology to do it. We treated the spores the same way as the others. The spores matured from March to July, but the best time to collect them is in April, depending on where the plant grows.

We saw *B. magellanicum* as equal to the other species and observe that this species takes more time to germinate and to form the first fronds. At this moment we don't have plants resulting from propagation in the nursery, but we established some mother plants which are producing spores for the first time this year. The spores we sowed this year formed prothallia after two months, but they still didn't form fronds.

In our study we are including the following species:

Adiantum chilense

Blechnum arcuatum

Blechnum chilense

Blechnum hastatum

Blechnum magellanicum

Gleichenia squamulosa

Hypolepis poepigii

Lophosoria quadripinnata

Lycopodium paniculatum

Polystichum chilense

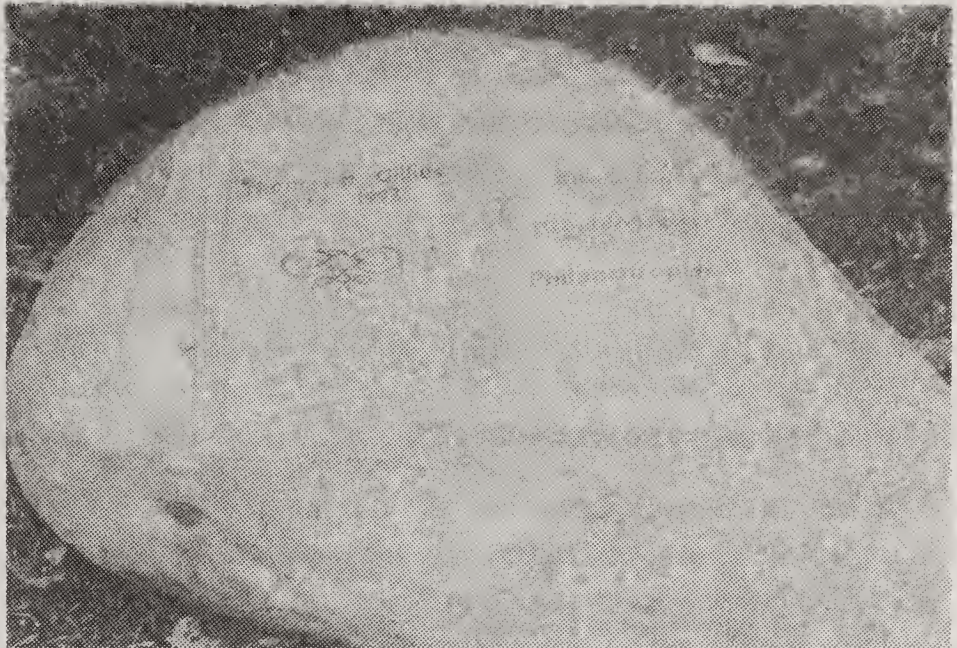
Rumohra adiantiformis

(And we are looking forward to hearing about them....Ed.)

In Honor of Thomas Daniel Gillies

Tom Gillies was born in South Bend, Washington, on October 18th, 1920 and died in Olympia, Washington in August of 1993.

Mr. Gillies earned a Bachelor of Arts at the University of Washington, a Bachelor of Library Science at Columbia University and a Master of Arts at Cornell University.



Memorial stone - Photo by Willanna Bradner.

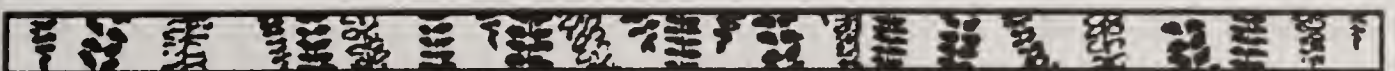
He was employed by the Linda Hall Library in Kansas City, Missouri for 29 years, and was its director from 1974 through 1982. The library is privately endowed and has over a million research and reference volumes and journals. "It ranks as a major scientific collection above or alongside the Library of Congress".

Mr. Gillies was responsible for the library's growth, development and its enviable reputation throughout the world. His travels representing The Linda Hall Library took him to many countries including Russia and China where mutually valuable relationships were established.

Following his retirement and return to the Northwest, Mr. Gillies volunteered at Mrs. Corydon Wagner's beautiful Lakewold Garden in Tacoma. It was she who stimulated his interest in ferns. Pursuing that interest, he joined the Hardy Fern Foundation in 1989, and became an active member. He was elected to the Board of Directors, and was President Elect of the Foundation at the time of his death.

Mr. Gillies' dedication was expressed in bequests of \$190,000 each to Lakewold, the Nature Conservancy, Grays Harbor College and the Hardy Fern Foundation, stipulating its use for education and preservation of our natural resources.

His generosity has made possible the garden created by John van den Meerendonk at the Kitsap County Bainbridge Island Library, as a gift of the Hardy Fern Foundation. The stone book by Molly Greist records our memory of him as librarian, pteridologist and philanthropist.



Fern Soaks Up Arsenic Like a Sponge

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A common fern has been found to soak up extraordinary amounts of arsenic without any ill effects, potentially offering a natural way of cleaning up polluted soil and water. The plant, known as the brake fern, grows naturally in the Southeast and California.

"It looks lush green," said Lena Ma, a soil chemist who led the research at the University of Florida at Gainesville. "When I take people to my greenhouse to look at a fern with 8,000 parts per million of arsenic, they can't imagine it's toxic waste."

The brake fern, whose scientific name is *Pteris vittata*, is the first plant known to accumulate arsenic in extremely high concentrations and still flourish, scientists said. The discovery was reported in Thursday's issue of the journal "Nature".

A crystalline chemical, arsenic is one of the best known poisons. It has often been the poison of choice in the arts, as in the classic film "Arsenic and Old Lace".

Arsenic taints many sources of drinking water in the United States and abroad. People who drink arsenic-contaminated water over long periods are believed to run a higher risk of bladder, lung and skin cancer, as well as other heart and lung ailments.

Some arsenic is naturally present in soil. It also comes from some farm chemicals, wood preservatives and other industrial products.

Ma said that, unlike many ferns, this one likes the sun. It could potentially be cultivated in water and act as a natural arsenic filter. And the fern's arsenic-loving genes could potentially be spliced into other plants.

"The fact that it can take something that is toxic at extremely low concentration and accumulate it at high concentrations is very useful," said Stephen Ebbs, a plant researcher at Southern Illinois University.

Some plants are already used to remove other pollutants from the environment, a process known as phytoremediation. But the plants do not concentrate the toxins as strongly as the brake fern. Other powerful accumulators are being tested, but these plants are generally small and thus collect chemicals in very small amounts. By contrast the brake fern collects the arsenic in fronds that grow up to 5 feet long. Unlike roots – where some plants accumulate pollutants – the fronds are easy to harvest when it is time to clear away the arsenic. Scientists said more work is needed on how to dispose of the plants.

The report of the fern's special properties comes at a time of intensified worry about arsenic in drinking water. Last year, a World Health Organization study said that up to 77 million of Bangladesh's people are at risk of poisoning from naturally occurring arsenic in drinking water. Two weeks ago, the Environmental Protection Agency announced a much tighter standard for arsenic in American drinking water, forcing about 3,000 communities to take stronger action.

The Florida researchers were looking for a plant that could take in soil arsenic in high concentrations and then be hauled away. They tested 14 species in an abandoned lum-

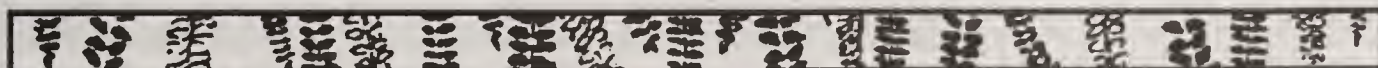
beryard contaminated by arsenic in Archer, Florida. Their tests showed that the brake ferns growing there concentrated up to 200 times the arsenic level in the soil. In other tests, the researchers spiked soil with varying levels of arsenic and found that brake ferns absorbed the poison at 10 to 64 times the original concentrations.

"She got incredibly lucky. She happened to pick the 14 and found one good one," said David Salt, a Northern Arizona University biochemist who specializes in such pollution-absorbing plants.

It is unclear if the fern is taking in arsenic as a nutrient or for some other reason.

Edenspace, a company in Dulles, VA, has bought rights and already begun to market the fern commercially.

(Editor's Note – I am growing this also – sown before knowing of its affinity for arsenic. I know others who are growing it as well and don't understand how one can "buy rights" to a species! Meanwhile, don't serve it in your salad!)



2001 Plant Distribution

The following ferns are available for fall shipment. Orders should be sent to Michelle Bundy, 1716 S. 223rd St., Des Moines, WA 98198. Orders must reach her no later than Friday Sept. 7. All ferns are \$7.00 with the exception of *Polypodium scolieri* which is \$10.00. You will be billed at time of shipping.

1. *Athyrium filix-femina* 'Branford Beauty' - Zone 5-8, Deciduous, 3'
2. *Doodia media* - Zone 8-10, Evergreen, 10"
3. *Dryopteris filix-mas* 'Crispatissima' - Zone 4-8, Deciduous, 18"
4. *Dryopteris hondoensis* - Zone 4-8, Evergreen, 2'
5. *Dryopteris scottii* - Zone 8-9, Evergreen, 2'
6. *Polypodium scolieri* - Zone 8-9, Evergreen, 15"
7. *Polystichum aculeatum* - Zone 4-8, Evergreen, 2'

Dryopteris sublacera

James R. Horrocks - Salt Lake City, Utah

Dryopteris is translated "Oak Fern" or "Wood Fern". *Sublacera* from lacerate, meaning "almost irregularly cut margins".

This is a denizen of mid to upper level forests of the Himalayas and China, mostly in the open ground but occasionally among rocks. It is a rather widespread species and is somewhat variable, occasionally displaying fronds that are wider and coarser with larger segments than the type. In cultivation it usually reverts to a more conservative appearance. The bipinnate fronds can attain a length of 24 inches or so and are quite evergreen. This quite robust species could be confused with any number of other *Dryopteris* species but the thick fronds are quite distinct. It was once considered a variety of *D. juxtaposita*, another Sino-Himalayan species, but is now considered separate. *D. sublacera* is an apogamous triploid, which may suggest a hybrid origin. It should not be confused with *D. lacera*, an Asian species with pinnules that are tapered to the tip rather than rounded. *D. sublacera* does not have the contracted fertile pinnae present in *D. lacera*.



Dryopteris sublacera. Photo by Richard Young
- Salt Lake City, Utah.

Description: The rhizome is erect and ascending, often producing offshoots. The fronds are broadly lanceolate, from 12 to 24 inches in length and bipinnate but with pinnules that are lobed at the base. The fronds are dark dull green above and pale silvery green beneath. The pinnae are narrowly triangular lanceolate, herbaceous with pinnules that are short, elongated and attached by a stalk or with a narrow point of attachment except in the upper part of the pinnae where they are widely attached. Here the pinnules can be somewhat crowded, running parallel to each other and ranging from unlobed to rather shallowly lobed, with somewhat rectangular lobes that have rounded-truncate apices. The basal pair are often rather enlarged. The stipe can be from one third to one half the length of the blade, the base being thickly clothed with large lanceolate reddish-brown scales which become narrower above. The scales leave a somewhat roughened surface when shed. The sori are rather large but not crowded, in two rows, one on each side halfway between the center and the margins of the pinnules. The indusia are curved down at the edges, rather thick, and at maturity become light to medium brown. The spores are dark brown and irregular, with both viable and abortive spores.

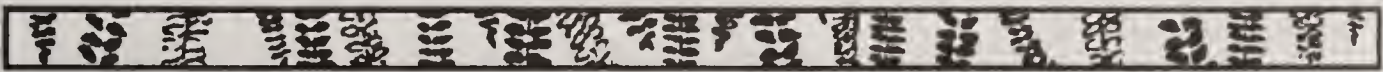
Culture: *Dryopteris sublacera* is rather easily cultivated in a rich moist soil. The fronds are evergreen and are quite robust. In the Author's garden, this attractive fern grows in a damp rocky spot with *D. goldiana* towering behind it, making an interesting combination. This species is a most desirable addition to any collection of ferns but is not always available.

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Fraser-Jenkins, Christopher R., *A Monograph of Dryopteris in the Indian Subcontinent*, Botany Series, Vol. 18, No. 5, British Museum of Natural History, London 1989.

Hoshizaki, Barbara Joe and Moran, Robbin C., *Fern Grower's Manual* (revised), Timber Press, Portland, OR 2001.

Rickard, Martin, *The Plantfinder's Guide to Garden Ferns*, Timber Press, Portland, OR 2000.



Garden Evaluations

2000

COASTAL MAINE BOTANICAL GARDEN,
2000 HFF EVALUATION

Genus, species	Year planted	Average frond length	Has it borne spore in the past year?	Garden worthiness 1(low) to 5(high)
<i>Adiantum aleuticum</i>	1999	20"	yes	5
<i>Athyrium filix-femina</i> 'Frizelliae'	1999	4.5"	no	5
<i>Dryopteris cristata</i>	1999	11.5	yes	5
<i>Dryopteris lacera</i> affinity	1999	13"	yes	5

continued on page 60

DALLAS ARBORETUM 2000 HFF EVALUATION

Genus, species	Year planted	Average frond length	Has it borne spore in the past year?	Garden worthiness 1(low) to 5(high)
<i>Dryopteris arguta</i>	1994	18"	no	4
<i>Dryopteris bissetiana</i>	1994	2.5"	no	5
<i>Dryopteris dilatata</i> 'Jimmy Dyce'	1994	12"	yes	2
<i>Dryopteris filix-mas</i> 'Undulata Robusta'	1994	18"	no	3
<i>Dryopteris wallichiana</i>	1995	30"	yes	5
<i>Polystichum setiferum</i>	1995	9"	no	3
<i>Adiantum venustum</i>	1996	2"	no	1
<i>Dryopteris celsa</i>	1996	12"	yes	3
<i>Dryopteris championii</i>	1996	7"	no	3
<i>Dryopteris crassirhizoma</i>	1996	10"	yes	3
<i>Dryopteris pseudo filix-mas</i>	1996	6"	no	3
<i>Dryopteris sublacera</i>	1996	12"	yes	5
<i>Dryopteris wallichiana</i>	1996	36"	yes	5
<i>Polystichum andersonii</i>	1996	24"	yes	4
<i>Cyrtomium macrophyllum</i>	1997	11"	yes	2
<i>Dryopteris affinis</i> 'Crispa Barnes'	1997	5"	no	1
<i>Dryopteris remota</i>	1997	24"	no	5
<i>Dryopteris sieboldii</i>	1997	24"	no	5
<i>Dryopteris sublacera</i>	1997	18"	yes	5
<i>Cyrtomium macrophyllum</i>	1998	12"	yes	5

<i>Cyrtomium falcatum</i> 'Rochfordianum'	1998	36"	yes	5
<i>Cyrtomium fortunei</i>	1998	16"	yes	5
<i>Dryopteris blanfordii</i>	1998	8"	no	2
<i>Dryopteris crispifolia</i>	1998	5"	no	2
<i>Dryopteris lacera</i> affinity	1998	18"	yes	5
<i>Dryopteris marginalis</i>	1998	24"	yes	5
<i>Dryopteris stewartii</i>	1998	12"	no	4
<i>Dryopteris sublacera</i>	1998	18"	yes	5

HARRY P. LEU GARDENS, 2000 HFF EVALUATION

Genus, species	Year planted	Average frond length	Has it borne spore in the past year?	Garden worthiness 1(low) to 5(high)
<i>Dryopteris celsa</i>	1998	30"	yes	4-5
<i>Dryopteris pseudo filix-mas</i>	1998	12"	yes	3
<i>Dryopteris sieboldii</i>	1998	12"	no	4-5
<i>Polystichum polyblepharum</i>	1998	24"	yes	4-5
<i>Polystichum setiferum</i>	1998	30"	yes	3
<i>Dryopteris bissetiana</i>	2000	6"	no	4
<i>Dryopteris corleyi</i>	2000	12"	yes	1-2
<i>Dryopteris cristata</i>	in nursery	6"	no	2
<i>Dryopteris lacera</i>	2000	12"	yes	4-5
<i>Dryopteris polylepis</i>	2000	12"	no	3

continued on page 62

INNISWOOD METRO GARDENS, 2000 HFF EVALUATION

Genus, species	Year planted	Average frond length	Has it borne spore in the past year?	Garden worthiness 1(low) to 5(high)
<i>Athyrium filix-femina</i> 'Vernoniae Cristatum'	1994	44"	yes	5
<i>Dryopteris erythrosora</i>	1994	20"	yes	5
<i>Phyllitis scolopendrium</i>	1994	18"	yes	5
<i>Dryopteris sacrosancta</i>	1995	22"	yes	5
<i>Dryopteris wallichiana</i>	1995	30"	yes	5
<i>Pteris excelsa</i>	1995	5"	no	1
<i>Thelypteris viridifrons</i>	1995	24"	yes	4
<i>Woodwardia fimbriata</i>	1995	5"	no	1
<i>Dryopteris affinis</i>	1996	15"	yes	5
<i>Dryopteris pseudo filix-mas</i>	1996	30"	yes	5
<i>Dryopteris sublacera</i>	1996	12"	yes	3
<i>Cyrtomium caryotideum</i>	1998	5"	no	2
<i>Cyrtomium macrophyllum</i>	1998	10"	no	3
<i>Dryopteris affinis</i> 'Crispa Barnes'	1998	22"	yes	5
<i>Dryopteris pseudo filix-mas</i>	1998	30"	yes	5
<i>Dryopteris remota</i>	1998	18"	no	4
<i>Athyrium filix-femina</i> 'Frizelliae'	1999	20"	no	5
<i>Blechnum spicant</i>	1999	24"	yes	5
<i>Dryopteris bissetiana</i>	1999	12"	yes	4

<i>Dryopteris corleyi</i>	1999	18"	yes	4
<i>Dryopteris kashmiriana</i>	1999	18"	no	4
<i>Dryopteris lacera</i> affinity	1999	24"	yes	5
<i>Dryopteris polylepis</i>	1999	20"	yes	5
<i>Dryopteris sieboldii</i>	1999	10"	no	4
<i>Polystichum munitum</i>	1999	12"	no	4
<i>Rumohra adiantiformis</i>	1999	18"	no	4

LEWIS GINTER BOTANICAL GARDEN, 2000 HFF EVALUATION

Genus, species	Year planted	Average frond length	Has it borne spore in the past year?	Garden worthiness 1(low) to 5(high)
<i>Adiantum aleuticum</i>	1999	34 cm	no	3
<i>Athyrium filix-femina</i> 'Frizelliae'	1999	38 cm	no	3
<i>Blechnum spicant</i>	1999	20 cm	no	1
<i>Dryopteris bissetiana</i>	1999	40 cm	yes	3
<i>Dryopteris corleyi</i>	1999	52 cm	yes	4
<i>Dryopteris cristata</i>	1999	54 cm	yes	5
<i>Dryopteris kashmiriana</i>	1999	20 cm	no	1
<i>Dryopteris polylepis</i>	1999	27 cm	no	1
<i>Dryopteris sieboldii</i>	1999	37 cm	no	4
<i>Polystichum munitum</i>	1999	29 cm	no	1
<i>Polystichum setiferum</i>	1999	52 cm	yes	5
<i>Woodsia intermedia</i>	1999	7.5 cm	no	1

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RHODODENDRON SPECIES BOTANICAL GARDEN, 2000 HFF EVALUATION

Genus, species	Year planted	Average frond length	Has it borne spore in the past year?	Garden worthiness 1(low) to 5(high)
<i>Asplenium trichomanes</i>		6"	yes	5
<i>Cyrtogramma crista</i>		11"	yes	5
<i>Dryopteris celsa</i>		30"	yes	5
<i>Onoclea sensibilis</i>		24"	yes	3
<i>Woodwardia areolata</i>		20"	yes	5
<i>Woodwardia fimbriata</i>		32"	yes	5
<i>Adiantum aleuticum</i> 'Subpumilum'	1990	12"	yes	5
<i>Adiantum pedatum</i>	1990	28"	yes	5
<i>Adiantum venustum</i>	1990	20"	yes	5
<i>Adiantum viride-montanum</i>	1990	29"	yes	4
<i>Arachnoides simplicior</i> var. major	1990	33"	yes	5
<i>Athyrium niponicum</i> 'Pictum'	1990	24"	yes	4
<i>Athyrium otophorum</i>	1990	30"	yes	5
<i>Blechnum spicant</i>	1990	36"	yes	5
<i>Blechnum spicant</i> 'Serratum Rickard'	1990	30"	yes	4
<i>Cyrtomium falcatum</i> x <i>caryotideum</i>	1990	20"	yes	5
<i>Cyrtomium macrophyllum</i>	1990	20"	yes	5
<i>Dryopteris championii</i>	1990	20"	yes	5
<i>Dryopteris cycadina</i>	1990	18"	yes	5

<i>Dryopteris dilatata</i>	1990	18"	yes	4
<i>Dryopteris erythrosora</i>	1990	24"	yes	5
<i>Dryopteris erythrosora</i> 'Prolifica'	1990	12"	yes	4
<i>Dryopteris filix-mas</i>	1990	42"	yes	5
<i>Dryopteris lacera</i>	1990	18"	yes	3
<i>Dryopteris ludoviciana</i>	1990	12"	yes	3
<i>Dryopteris polylepis</i>	1990	24"	yes	5
<i>Dryopteris pseudo filix-mas</i>	1990	46"	yes	5
<i>Dryopteris sieboldii</i>	1990	28"	yes	5
<i>Dryopteris wallichiana</i>	1990	45"	yes	5
<i>Gymnocarpium dryopteris</i>	1990	10"	yes	5
<i>Gymnocarpium dryopteris</i> 'Plumosum'	1990	10"	yes	5
<i>Matteuccia struthiopteris</i>	1990	24"	yes	2
<i>Osmunda claytoniana</i>	1990	22"	yes	4
<i>Phyllitis scolopendrium</i>	1990	16"	yes	5
<i>Polypodium scolieri</i>	1990	13"	yes	5
<i>Polystichum acrostichoides</i>	1990	15"	yes	4
<i>Polystichum aculeatum</i>	1990	20"	yes	4
<i>Polystichum braunii</i>	1990	20"	yes	5
<i>Polystichum polyblepharum</i>	1990	18"	yes	5
<i>Polystichum retrosopalaeeum</i>	1990	24"	yes	4
<i>Polystichum tsus-simense</i>	1990	13"	yes	5
<i>Polystichum x illyricum</i>	1990	16"	yes	3

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<i>Thelypteris decursive-pinnata</i>	1990	23"	yes	5
<i>Thelypteris phegopteris</i>	1990	16"	yes	4
<i>Woodsia obtusa</i>	1990	15"	yes	4
<i>Asplenium trichomanes</i> 'Incisum'	1991	11"	yes	4
<i>Cyrtomium caryotideum</i>	1991	20"	yes	5
<i>Dryopteris formosana</i>	1991	18"	yes	5
<i>Polystichum californicum</i>	1991	12"	yes	2
<i>Polystichum makinoi</i>	1991	20"	yes	5
<i>Polystichum neolobatum</i>	1991	14"	yes	5
<i>Blechnum penna-marina</i>	1993	11"	yes	5
<i>Cyrtomium lonchitoides</i>	1994	12"	yes	4
<i>Dryopteris cystolepidota</i>	1994	30"	yes	5
<i>Dryopteris lepidopoda</i>	1994	24"	yes	5
<i>Dryopteris sacrosancta</i>	1996	20"	yes	3
<i>Hypolepis punctata</i>	1996	20"	yes	4
<i>Osmunda regalis</i>	1996	42"	yes	5
<i>Polystichum munitum</i> x <i>andersonii</i>	1996	20"	yes	4
<i>Gymnocarpium oyamense</i>	1997	10"	yes	5
<i>Osmunda cinnamomea</i>	1997	36"	yes	5
<i>Blechnum cordatum</i>	1999	36"	yes	5
<i>Blechnum niponicum</i>	1999	6"	yes	5
<i>Cheilanthes lendigera</i>	1999	5"	no	4
<i>Doodia media</i>	1999	15"	yes	5
<i>Dryopteris bissetiana</i>	1999	6"	no	3

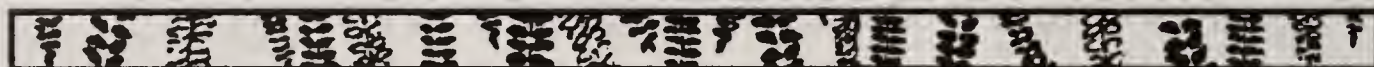
<i>Dryopteris blanfordii</i>	1999	18"	yes	5
<i>Dryopteris corleyi</i>	1999	15"	yes	4
<i>Dryopteris kashmiriana</i>	1999	18"	yes	3
<i>Dryopteris marginalis</i>	1999	15"	yes	5
<i>Dryopteris pacifica</i>	1999	15"	yes	4
<i>Dryopteris pycnopteroides</i>	1999	14"	yes	4
<i>Dryopteris stewartii</i>	1999	15"	yes	3
<i>Dryopteris x australis</i>	1999	18"	yes	4
<i>Polypodium interjectum</i>	1999	10"	yes	4
<i>Rumohra adiantiformis</i>	1999	10"	yes	1
<i>Woodsia intermedia</i>	1999	4"	yes	5
<i>Woodwardia unigemmata</i>	1999	30"	yes	5
<i>Dryopteris uniformis</i>	1999	18"	yes	4

STEPHEN F. AUSTIN, 2000 HFF EVALUATION

Genus, species	Year planted	Average frond length	Has it borne spore in the past year?	Garden worthiness 1(low) to 5(high)
<i>Blechnum spicant</i>	1999	6-8"	no	5
<i>Cyrtomium caryotideum</i>	1997	8-10"	yes	5
<i>Cyrtomium fortunei</i>	1997	20-24	yes	5
<i>Cyrtomium fortunei</i> 'Rochfordianum'	1998	20-24"	yes	5
<i>Cyrtomium macrophyllum</i>	1997	6-12"	no	4

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<i>Dryopteris affinis</i> 'Azorica'	1998	6-12	yes	4
<i>Dryopteris celsa</i>	1998	12-15"	yes	5
<i>Dryopteris championii</i>	1997	15-20"	yes	5
<i>Dryopteris corleyi</i>	1999	10-12"	yes	3
<i>Dryopteris crassirhizoma</i>	1997	8-12"	no	4
<i>Dryopteris lacera</i> affinity	1999	6-10"	yes	4
<i>Dryopteris pseudo filix-mas</i>	1997	15-18"	yes	5
<i>Dryopteris sacrosancta</i>	1997	15-18"	yes	5
<i>Dryopteris seiboldii</i>	1997	6-12"	no	3
<i>Dryopteris stewartii</i>	1998	10-12"	yes	4
<i>Polypodium interjectum</i>	1998	6"	no	1
<i>Polystichum polyblepharum</i>	1997	10-12"	yes	5
<i>Polystichum setiferum</i>	1997	15-18"	yes	5
<i>Rumohra adiantiformis</i>	1999	6"	yes	2



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Lyman H. Black	Loree Speedy
Mary Elliott / Louisiana	Richard A. Steffen
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